



Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Goose and Saline Creeks

Waterbody Segments at a Glance:

County: Madison
Nearby Cities: Fredericktown
Lengths of impairment: 0.5 mile (Goose Creek)
0.5 mile (Saline Creek)
Pollutant: Nickel
Source: Madison mine artesian flow



State map showing location of watershed

TMDL Priority Ranking: TMDL Completed 1999

Description of the Problem

Beneficial uses of Goose and Saline Creeks

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health associated with Fish Consumption

Use that is impaired

- Protection of Warm Water Aquatic Life.

Standards that apply

- Missouri's Water Quality Standards may be found in 10 CSR 20-7.031 Table A. The applicable standard for nickel is 500 micrograms per liter ($\mu\text{g/L}$ or parts per billion) as dissolved metal.

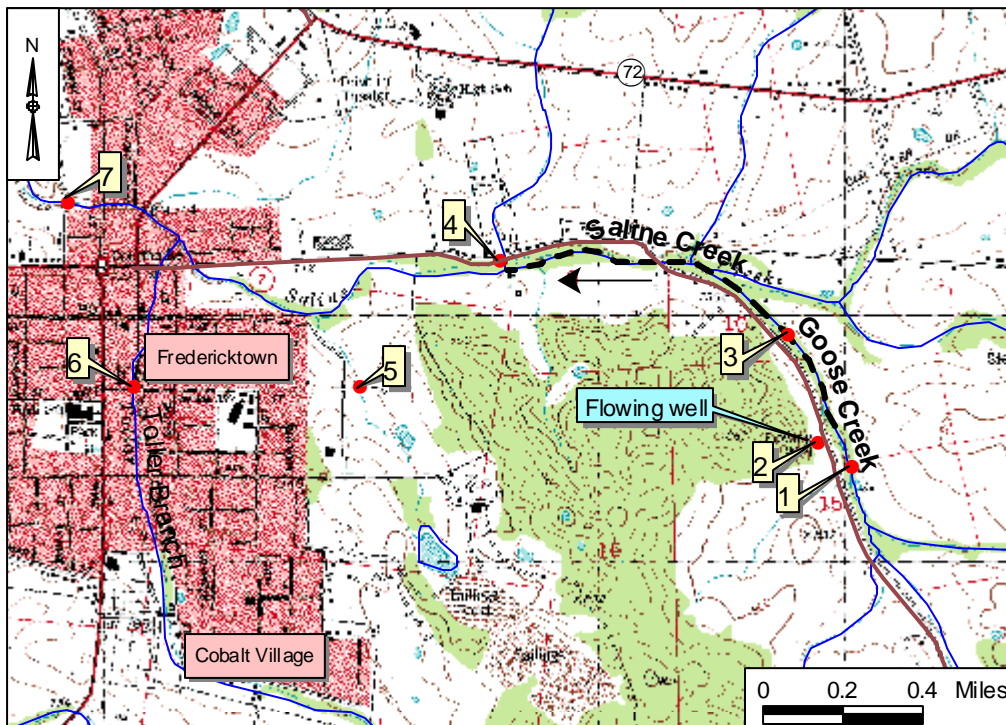
Background Information and Water Quality Data

Madison Mine near Fredericktown has been used as a source of lead, copper, nickel and cobalt. It was mined off and on from 1847 to 1961. Groundwater has flooded most of the mine. Metal bearing minerals in the walls of the mine continue to be dissolved and the metals released into the mine water. The main mine opening is the main exit point for this groundwater. It is identified on topographic maps as a "flowing well." The mine water flows eastward about 500 feet before entering Goose Creek, which flows into Saline Creek. This mine water contains elevated levels of both dissolved nickel and cobalt. Madison Mine was given a discharge permit with water quality-protective nickel and cobalt limits in 1997. These limits would become effective in June 2000. The U.S. Environmental Protection Agency approved a TMDL for nickel December 1, 1999. A TMDL for cobalt was written, too, but not required. Whatever is done to lower nickel levels will also lower

the cobalt levels. The permittee has since attempted to plug the mine opening to eliminate this discharge.

The table below summarizes mean (average) dissolved nickel and cobalt data in Goose and Saline Creeks near the Madison Mine. This data suggests that water quality standards for these metals are being met (as of 9/2003) in Saline Creek, but not in the portion of Goose Creek downstream of the main mine opening. Sampling will continue to determine where the metals originate, since there appears to be no flow coming from the mine opening.

Saline and Goose Creeks in Madison County, Missouri, with Sampling Sites



--- Impaired Segment

← Direction of Flow

Site Index

- 1 – Goose Creek 0.1 mile above artesian flow
- 2 – Madison Mine artesian flow
- 3 – Goose Creek 0.2 mile below artesian flow
- 4 – Saline Creek 0.5 mile above Smelter tributary
- 5 – Tributary to Saline Creek from Madison Mine smelter area
- 6 – Toller Branch 1 mile below Madison tailing pond
- 7 – Saline Creek 0.3 mile below Toller Branch

| Table 1. Mean Concentrations of Dissolved Nickel and Cobalt in the Vicinity of the Madison Mine, Fredericktown, Mo. 1996-2003 and Number of Samples Used to Calculate the Mean (#) | | | |
|---|--|----------------------------|----------------------------|
| Site | Location | Dissolved Nickel (µg/L) | Dissolved Cobalt (µg/L) |
| 1 | Goose Cr. 0.1 mile upstream of mine discharge | 65.1 (4) | 20.8 (4) |
| 2 | Artesian mine discharge | 3,588 (6) | 2,773 (6) |
| 3 | Goose Cr. 0.2 miles downstream of mine discharge | 1,589 (4) | 1,009 (4) |
| 4 | Saline Creek 0.5 mile above Smelter Tributary | 35.25 (4) | 16.5 (4) |
| 5 | Tributary to Saline Creek from Madison Mine smelter area | 957.5 (12) | 377.14 (12) |
| 6 | Toller Branch 1 mile below tailings pond | 24.9 (11) | 7.9 (11) |
| 7 | Saline Cr. 0.3 mi. below Toller Branch | 177.9 (11) | 61.9 (11) |
| | Water Quality Standard | 500* | 1,000** |

Source: Missouri Department of Natural Resources, Terranext Inc.

*Standard is for protection of aquatic life.

**Standard is for protection of livestock and wildlife drinking water supply.

For more information call or write:

Missouri Department of Natural Resources

Water Protection Program

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